Effects of Dietary Supplementation with Sterculia Oil and Rosiglitazone on Fatty Acid Composition and Content in Sheep Tissues (Postprint)

Authors: Shi Xiaoxue, Niu Zhanyu, Xing Chao, Zhang Sanrun, Yan Wanshu, Zhang Runhou

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Abstract

This study aimed to investigate the effects of dietary supplementation of stearoyl-CoA desaturase (SCD) inhibitor (sterculic oil) and promoter (rosiglitazone) on the fatty acid composition and content in the longissimus dorsi muscle and subcutaneous adipose tissue of sheep. Eighteen crossbred rams (Merino × Small-tailed Han) with an average body weight of (27.71±2.64) kg and similar physiological condition were randomly divided into 3 groups (n=6). The control group (group C) was fed a basal diet + 4.8% flaxseed, the sterculic oil group (group W) was fed the group C diet + 15 g/d sterculic oil, and the rosiglitazone group (group L) was fed the group C diet + 8 mg/d rosiglitazone. The experimental period lasted 50 d, including a 10-d adaptation period, a 5-d preliminary period, and a 35-d formal experimental period. The results showed that: 1) Compared with group C, the contents of trans-11 C18:1 and trans-9,12 C18:2 in the longissimus dorsi muscle of group W were significantly increased ($P<0.05$), the content of C18:3(n-6) was significantly decreased ($P<0.05$), and the content of C20:1 in subcutaneous adipose tissue was significantly increased ($P<0.05$), while the contents of other fatty acids showed no significant changes ($P>0.05$); 2) Compared with group C, the contents of trans-11 C18:1, trans-9,12 C18:2, cis-9, trans-11 CLA, polyunsaturated fatty acids (PUFA), and the PUFA/saturated fatty acids (SFA) ratio in the longissimus dorsi muscle of group L were significantly increased ($P<0.05$), the contents of C18:3(n-6) and SFA were significantly decreased ($P<0.05$), and the contents of capric acid (C10:0), cis-9 C18:1, and C20:3(n-3) in subcutaneous adipose tissue were significantly increased ($P<0.05$). The results suggest that dietary supplementation of sterculic oil increased the contents of trans-11 C18:1 and trans-9,12 C18:2, decreased the content of C18:3(n-6) in the longissimus dorsi muscle, and increased the content of C20:1 in subcutaneous adipose tissue of sheep; dietary supplementation of rosiglitazone increased the contents

of trans-11 C18:1, trans-9,12 C18:2, and cis-9, trans-11 CLA, decreased the content of C18:3(n-6) in the longissimus dorsi muscle, and increased the contents of C10:0, cis-9 C18:1, and C20:3(n-3) in subcutaneous adipose tissue of sheep.

Full Text

Effects of Dietary Supplementation of Phoenix Tree Seed Oil and Rosiglitazone on Tissue Composition and Contents of Fatty Acids of Sheep

SHI Xiaoxue[1], **NIU Zhanyu**[1], **XING Chao**[1], **ZHANG Sanrun**[2], **YAN Wanshu**[1], **ZHANG Runhou**[1]*

[1]College of Animal Science, Inner Mongolia Agricultural University, Hohhot 010018, China
[2]Department of Basic Education, Inner Mongolia Medical University, Hohhot 010110, China

Abstract: This study investigated the effects of dietary supplementation of stearoyl-CoA desaturase (SCD) inhibitor (phoenix tree seed oil) and promoter (rosiglitazone) on fatty acid composition and contents in the Longissimus dorsi muscle and subcutaneous fat of sheep. Eighteen crossbred ram lambs (Merino × Small-tailed Han) with similar physiological status and average body weight of (27.71±2.64) kg were randomly allocated into three groups of six animals each. The control group (C) received a basal diet supplemented with 4.8% linseed, the phoenix tree seed oil group (W) received the C diet plus 15 g/d phoenix tree seed oil, and the rosiglitazone group (L) received the C diet plus 8 mg/d rosiglitazone. The 50-day experimental period consisted of a 10-day transition phase, a 5-day preliminary period, and a 35-day formal trial period. The results showed that: 1) Compared with group C, group W exhibited significantly increased contents of trans-11 C18:1 and trans-9,12 C18:2 ($P<0.05$) and significantly decreased C18:3(n-6) content ($P<0.05$) in the Longissimus dorsi muscle, while subcutaneous fat showed significantly elevated eicosenoic acid (C20:1) content ($P<0.05$) with no significant changes in other fatty acids ($P>0.05$); 2) Compared with group C, group L demonstrated significantly increased contents of trans-11 C18:1, trans-9,12 C18:2, cis-9,trans-11 conjugated linoleic acid (CLA), polyunsaturated fatty acids (PUFA), and PUFA/saturated fatty acid (SFA) ratio ($P<0.05$), along with significantly reduced C18:3(n-6) and SFA contents ($P<0.05$) in the Longissimus dorsi muscle, while subcutaneous fat showed significantly increased contents of capric acid (C10:0), cis-9 oleic acid (cis-9 C18:1), and eicosatrienoic acid (C20:3)(n-3) ($P<0.05$). These findings indicate that dietary phoenix tree seed oil supplementation increases trans-11 C18:1 and trans-9,12 C18:2 contents while decreasing C18:3(n-6) content in sheep Longissimus dorsi muscle, and elevates C20:1 content in subcutaneous fat; whereas rosiglitazone supplementation increases trans-11 C18:1, trans-9,12 C18:2, and cis-9,trans-11 CLA contents while decreasing C18:3(n-6) content in Longissimus

dorsi muscle, and increases C10:0, cis-9 C18:1, and C20:3(n-3) contents in subcutaneous fat.

Keywords: phoenix tree seed oil; rosiglitazone; stearoyl-CoA desaturase; fatty acid; sheep

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In recent years, China' s sheep industry, particularly in border minority regions such as Inner Mongolia, has developed rapidly, with mutton consumption increasing as a proportion of total meat intake. However, mutton contains high fat content, with approximately 40% being saturated fatty acids associated with obesity, hypertension, coronary heart disease, and various cancers. Research has demonstrated that conjugated linoleic acid (CLA) possesses numerous beneficial biological functions, including anti-tumor activity, anti-atherosclerotic effects, diabetes prevention, immune system modulation, obesity prevention, and promotion of bone development and health [1]. Therefore, reducing saturated fatty acid content while increasing functional fatty acids such as CLA in mutton fat holds significant importance for consumer health.

Studies indicate that 64%–78% of CLA in milk fat is synthesized endogenously from trans-vaccenic acid (TVA) via stearoyl-CoA desaturase (SCD) [2], while 86% of CLA in beef originates from TVA through SCD desaturation [3]. Human studies have also shown the capacity to synthesize CLA from TVA [4]. Currently, research on CLA endogenous synthesis pathways is extensive in other animals but limited in sheep. This experiment investigates the effects of dietary SCD inhibitor (phoenix tree seed oil) and promoter (rosiglitazone) on fatty acid composition in sheep Longissimus dorsi muscle and subcutaneous fat to elucidate the endogenous synthesis mechanisms of functional fatty acids like CLA, providing theoretical foundations for producing CLA-enriched mutton.

1.1 Experimental Materials

The trial was conducted at the Inner Mongolia Agricultural University breeding base in Tuzuo Banner, Youmuite Company (November 2016 to January 2017). Eighteen crossbred ram lambs (Merino × Small-tailed Han) approximately four months old, with consistent genetic background, good health status, and average body weight of (27.71±2.64) kg were provided by Youmuite Company. The basal diet was a commercial fattening feed provided by Youmuite Company. Phoenix tree seed oil, extracted via subcritical low-temperature extraction, was purchased from Shaanxi Senfu Natural Products Co., Ltd. (batch number: SF-2016-10-13-4). Rosiglitazone, manufactured by Chengdu Hengrui Pharmaceutical Co., Ltd. (batch number: 160902), was purchased from Hohhot Guoda Pharmacy.

1.2 Experimental Design and Diets

A completely randomized design was employed, dividing 18 sheep into three groups: control (C), phoenix tree seed oil (W), and rosiglitazone (L), with six animals per group housed individually in pens (2.0 m × 1.2 m). Dietary treatments were: 1) Group C: basal diet + 4.8% linseed; 2) Group W: C diet + 15 g/d phoenix tree seed oil; 3) Group L: C diet + 8 mg/d rosiglitazone. The basal diet had a concentrate-to-forage ratio of 60:40. Composition and nutrient levels of the basal diet are presented in Table 1 , and fatty acid composition of the basal diet, linseed, and phoenix tree seed oil is shown in Table 2 .

Table 1 Composition and nutrient levels of basal diet (air-dry basis)

Items	Content
Ingredients	
Corn	
Corn germ meal	
Sunflower shell	
Leymus chinensis	
DDGS	
Soybean meal	
Wheat bran	
Premix[1]	
Stone powder	
NaCl	
CaHPO	
Total	
Nutrient levels[2]	
ME/(MJ/kg)	
CP	
EE	
NDF	
ADF	

[1]The premix provided per kg of diet: I (as potassium iodide) 55 mg, Mn (as manganese sulfate) 1,750 mg, Co (as cobalt chloride) 25 mg, Se (as sodium selenite) 22.5 mg, Fe (as ferrous sulfate) 3,000 mg, Zn (as zinc sulfate) 2,000 mg, VA 400,000 IU, VD 30,000 IU, VE 3,000 IU.
[2]CP was measured, while others were calculated values.

Table 2 Composition and content of fatty acids in basal diet, linseed, and phoenix tree seed oil (percentage of total fatty acids)

Fatty acids	Basal diet	Linseed	Phoenix tree seed oil
Palmitic acid C16:0			
Stearic acid C18:0			
Oleic acid C18:1(n-9)			
Linoleic acid C18:2(n-6)			
Linolenic acid C18:3(n-3)			

1.3 Animal Management

Prior to the experiment, sheep pens and surrounding environments were disinfected with povidone-iodine spray, and all equipment was thoroughly cleaned and sterilized. All experimental sheep were dewormed and vaccinated uniformly before the trial. Animals were fed daily at 07:00 and 17:00 with ad libitum water access. The 50-day experimental period comprised a 10-day transition, 5-day preliminary, and 35-day formal trial period. Phoenix tree seed oil for group W was thoroughly mixed with the diet before feeding, while rosiglitazone for group L was administered orally prior to feeding.

1.4 Sample Collection and Processing

Following the feeding trial, all sheep were transported to a nearby abattoir for slaughter after a 12-hour fast with free water access. After exsanguination, approximately 100 g samples of Longissimus dorsi muscle and subcutaneous fat were collected, immediately frozen in liquid nitrogen, and stored at -20°C for subsequent fatty acid composition analysis.

1.5 Analytical Methods

1.5.1 Fatty Acid Analysis of Basal Diet A 0.5 g feed sample was placed in a high-temperature resistant tube with a polytetrafluoroethylene-lined cap. One milliliter of anhydrous methanol, 1 mL of 2% sodium hydroxide methanol solution (prepared by dissolving 2 g NaOH in 100 mL methanol with 0.5% water, freshly prepared), and 0.5 mL of n-hexane were added. After capping, the tube was heated in a 50°C water bath for 15 minutes. After cooling, 4 mL of 10% hydrochloric acid methanol (prepared by slowly adding 10 mL acetyl chloride to 100 mL anhydrous methanol) was added, and the tube was heated at 90°C for 2 hours with occasional gentle shaking to prevent leakage. After cooling to room temperature, 2 mL of n-hexane and 15 mL of distilled water were added, mixed, and allowed to stand for 10 minutes. The organic layer was transferred to a clean 10 mL volumetric flask, left for 5 minutes, then dried with 1 g anhydrous sodium sulfate before gas chromatography analysis.

1.5.2 Fatty Acid Analysis of Phoenix Tree Seed Oil Two hundred microliters of phoenix tree seed oil was placed in a 10 mL tube with 2 mL of petroleum

ether:benzene (1:1) solution. After thorough mixing, 2 mL of 0.4 mol/L potassium hydroxide methanol solution (2.24 g KOH dissolved in 100 mL methanol) was added. Following vigorous mixing, 8 mL distilled water was added along the tube wall and allowed to stand for 15 minutes before the organic layer was analyzed by gas chromatography.

1.5.3 Fatty Acid Analysis of Longissimus dorsi Muscle and Subcutaneous Fat A 100 mg sample was placed in a 15 mL centrifuge tube with 2 mL of 2% sodium hydroxide methanol solution and heated at 85°C for 30 minutes. Three milliliters of 14% boron trifluoride methanol solution was then added and heated at 85°C for another 30 minutes. After cooling to room temperature, 1 mL of n-hexane was added, shaken for 2 minutes, and left to stand for 1 hour for layer separation. One hundred microliters of the supernatant was diluted to 1 mL with n-hexane, filtered through a 0.45 m membrane, and analyzed.

1.6 Statistical Analysis

Data were initially processed using Excel 2003, followed by one-way ANOVA using SAS 9.1 software. Duncan' s multiple range test was used for post-hoc comparisons, with $P<0.05$ considered statistically significant.

2.1 Effects on Fatty Acid Composition in Longissimus dorsi Muscle

As shown in Table 3 , no significant differences were observed among groups in monounsaturated fatty acid (MUFA) content or n-6/n-3 ratio ($P>0.05$). However, compared with group C, group L exhibited significantly decreased saturated fatty acid (SFA) content and significantly increased polyunsaturated fatty acid (PUFA) content and PUFA/SFA ratio ($P<0.05$) in Longissimus dorsi muscle. Group W showed significantly increased trans-11 C18:1 and trans-9,12 C18:2 contents and decreased C18:3(n-6) content ($P<0.05$), with no significant effects on other fatty acids ($P>0.05$). Group L significantly increased trans-11 C18:1, trans-9,12 C18:2, and cis-9,trans-11 CLA contents while decreasing C18:3(n-6) content ($P<0.05$), with no significant effects on remaining fatty acids. Compared with group W, group L showed significantly increased trans-11 C18:1 and cis-9,trans-11 CLA contents and significantly decreased capric acid (C10:0) content ($P<0.05$).

Table 3 Effects of dietary supplementation of phoenix tree seed oil and rosiglitazone on fatty acid composition and contents in Longissimus dorsi muscle of sheep (percentage of total fatty acids)

Items	Groups	P-value
C8:0 Caprylic acid	0.109[3]ab	
C10:0 Capric acid	0.1469a	0.0787b
C11:0 Undecanoic acid		
C12:0 Lauric acid		

Items	Groups	P-value
C13:0 Tridecylic acid		
C14:0 Myristic acid		
C15:0 Pentadecanoic acid		
C16:0 Palmitic acid		
C16:1 Palmitoleic acid		
C17:0 Margaric acid		
C17:1 Heptadecenoic acid		
C18:0 Stearic acid		
Cis-9 C18:1		
Trans-9 C18:1		
Trans-11 C18:1	1.3787c	0.2397b
Cis-6 C18:2	0.2624b	0.0448a
Trans-9,12 C18:2	47.9730a	13.2333b
Cis-9,12 C18:2	0.2616b	2.8659b
Cis-9,trans-11 CLA	0.6682a	0.3193b
C18:3(n-6)	0.0317b	
C20:0 Arachidic acid	48.3360a	
C20:1 Eicosenoic acid	13.5964b	0.2759b
C20:2 Eicosadienoic acid	4.5445a	0.5944a
C20:3(n-3)	0.5960a	
C20:4(n-6) Arachidonic acid	0.0244b	
C20:5(n-3) EPA	45.7670b	
C21:0 Heneicosanoic acid	15.7095a	
C22:0 Behenic acid	0.3486a	
C22:1(n-9) Erucic acid		
C22:6(n-3) DHA		
C23:0 Tricosanoic acid		
C24:0 Lignoceric acid		
SFA		
MUFA		
PUFA		
PUFA/SFA		
n-6/n-3		

In the same row, values with different small letter superscripts indicate significant differences (P<0.05), while values with the same or no superscripts indicate no significant differences (P>0.05). The same applies below.

2.2 Effects on Fatty Acid Composition in Subcutaneous Fat

As presented in Table 4 , no significant differences were detected among groups in SFA, MUFA, PUFA contents, PUFA/SFA ratio, or n-6/n-3 ratio in subcutaneous fat (P>0.05). Compared with group C, group W showed significantly

increased eicosenoic acid (C20:1) content (P<0.05), while group L exhibited significantly elevated C10:0, cis-9 C18:1, and C20:3(n-3) contents (P<0.05) with no significant changes in other fatty acids (P>0.05). Compared with group W, group L demonstrated significantly increased C10:0, stearic acid (C18:0), cis-9 C18:1, and C20:3(n-3) contents, and significantly decreased C11:0, tridecylic acid (C13:0), pentadecanoic acid (C15:0), and C20:1 contents (P<0.05). Notably, cis-12,trans-10 CLA was not detected in group L subcutaneous fat.

Table 4 Effects of dietary supplementation of phoenix tree seed oil and rosiglitazone on fatty acid composition and contents in subcutaneous fat of sheep (percentage of total fatty acids)

Items	Groups	P-value
C8:0 Caprylic acid	0.2579b	0.0225ab
C10:0 Capric acid	0.0886ab	1.1399ab
C11:0 Undecanoic acid	6.3273ab	30.0580b
C12:0 Lauric acid	0.0242b	0.0138b
C13:0 Tridecylic acid	0.2540b	0.0318a
C14:0 Myristic acid	0.1265a	1.4669a
C14:1 Myristoleic acid	5.9341b	30.2390b
C15:0 Pentadecanoic acid	0.0312a	0.0126b
C16:0 Palmitic acid	0.3652a	0.0149b
C16:1 Palmitoleic acid	0.0459b	0.8669b
C17:0 Margaric acid	7.6298a	33.2131a
C17:1 Heptadecenoic acid	0.0238b	0.0163a
C18:0 Stearic acid		
Cis-9 C18:1		
Trans-9 C18:1		
Trans-11 C18:1		
Cis-6 C18:2		
Trans-9,12 C18:2		
Cis-9,12 C18:2		
Cis-9,trans-11 CLA		
Cis-12,trans-10 CLA		
C18:3(n-6)		
C20:0 Arachidic acid		
C20:1 Eicosenoic acid		
C20:2 Eicosadienoic acid		
C20:3(n-3)		
C20:4(n-6) Arachidonic acid		
C20:5(n-3) EPA		
C21:0 Heneicosanoic acid		
C22:0 Behenic acid		
C22:1(n-9) Erucic acid		
C22:6(n-3) DHA		

Items	Groups	P-value
C23:0 Tricosanoic acid		
C24:0 Lignoceric acid		
SFA		
MUFA		
PUFA		
PUFA/SFA		
n-6/n-3		

3.1 Determination of Supplemental Levels

CLA occurs in meat products, dairy, seafood, and plant-based foods, though its content and biological activity vary considerably. Biologically active CLA primarily originates from ruminant products, with over 75% being cis-9,trans-11 CLA [5]. Given its physiological functions—including anti-carcinogenic, anti-atherosclerotic, immune-enhancing, obesity-preventing, and metabolic regulatory effects—research on CLA synthesis, sources, and strategies to increase its content in animal products has attracted considerable attention. TVA serves as a crucial substrate for endogenous CLA synthesis in ruminant tissues. Studies show that when ruminants consume C18:3-rich feed, C18:3 undergoes biohydrogenation in the rumen to produce TVA, which is then desaturated by SCD in mammary and other tissues to form CLA, with 78% of CLA synthesized via SCD desaturation of TVA [6]. Consequently, this experiment supplemented the basal diet with 4.8% linseed to increase TVA precursors for endogenous CLA synthesis.

Phoenix tree seed oil served as the SCD activity inhibitor. This oil contains substantial unsaturated fatty acids, including 22.83% oleic acid (C18:1), 27.81% linoleic acid (C18:2), and 23.22% sterculic acid. Research indicates that SCD1 activity and gene expression are influenced by dietary fatty acid composition and saturation, with SFA enhancing SCD1 activity while PUFA exerts inhibitory effects [6]. Kay et al. [7] successfully utilized sterculic acid-rich sterculia oil as an SCD inhibitor in dairy cow studies. Griinari et al. [2] abomasally infused 10 g/d sterculia oil in lactating cows and demonstrated that milk fat CLA was primarily synthesized endogenously from TVA via SCD. Given the similar sterculic acid content between sterculia and phoenix tree seed oils, this experiment substituted sterculia oil with phoenix tree seed oil. Based on sheep body weight, the abomasal infusion rate would be 1.5 g/d; however, considering that approximately 90% of PUFA undergoes ruminal hydrogenation, the dietary supplementation level was set at 15 g/d for the feeding trial.

Rosiglitazone, a thiazolidinedione insulin sensitizer that enhances target tissue insulin sensitivity and combats insulin resistance, was selected as the SCD activity promoter. Insulin acts as a potent transcriptional promoter of the SCD gene, an effect confirmed in mice, cattle, chickens, and humans through in vivo and in vitro studies [8]. Research reports that 8 mg/d rosiglitazone administration

to type II diabetes patients increases SCD activity and gene expression [9]. To avoid compromising sheep health, this experiment adopted 8 mg/d rosiglitazone supplementation.

3.2 Effects on Sheep Performance

Previous studies from our group demonstrated that phoenix tree seed oil and rosiglitazone supplementation had no significant effects on initial body weight, final body weight, average daily gain (ADG), dry matter intake (DMI), or dressing percentage [10]. The phoenix tree seed oil results align with previous findings. Studies in goats showed that soybean or sunflower oil supplementation did not affect DMI, likely due to similar dietary metabolizable energy levels across treatments [11]. Zhao [1] reported no significant effects on performance indicators when supplementing 2.4% fish oil, sunflower oil, or their combination in Ba Mei sheep diets. Ferreira et al. [12] observed no significant effects on DMI, ADG, or final body weight in finishing sheep fed fish oil or fish oil-soybean oil blends. Although phoenix tree seed oil did not significantly affect performance parameters, numerical improvements were observed compared with group C [10], possibly due to enhanced palatability and feed intake. Rosiglitazone supplementation as an insulin sensitizer did not significantly affect performance but reduced feed efficiency, potentially by decreasing serum glucose concentration, thereby increasing glucagon secretion and promoting lipolysis. No previous reports exist on rosiglitazone supplementation in sheep diets.

3.3 Effects on Tissue Fatty Acid Content

Animal fatty acid composition is influenced by breed, slaughter age, and nutrition, with dietary manipulation capable of altering tissue PUFA content, particularly CLA deposition. Ruminant meat and dairy products represent the primary dietary CLA source for humans, and supplementing PUFA-rich feeds constitutes an important strategy to enhance CLA content. This approach operates through two mechanisms: increasing ruminal hydrogenation substrates for CLA synthesis and TVA production, and inhibiting SCD gene expression to reduce TVA-to-CLA conversion, with the substrate enhancement effect predominating over the inhibitory effect [3,13]. This experiment's use of SCD inhibitors and promoters to explore endogenous synthesis mechanisms of functional fatty acids in sheep tissue holds significant importance.

Studies show that supplementing dairy cow diets with sunflower oil (rich in linoleic acid), linseed oil (rich in C18:3), or rapeseed oil (rich in oleic acid) increases milk fat TVA and CLA contents [14]. Supplementing Yanbian cattle diets with whole or crushed linseed elevated CLA content in Longissimus dorsi muscle, subcutaneous fat, and intermuscular fat [6]. Zhao [1] reported that sunflower oil supplementation in Ba Mei sheep diets significantly increased tissue cis-9,trans-11 CLA and cis-12,trans-10 CLA contents. Chen [15] demonstrated that soybean or corn oil supplementation in sheep diets significantly increased TVA, cis-9,trans-11 CLA, cis-12,trans-10 CLA, and total CLA contents. Stercu-

lia oil rich in sterculic acid increased cellular TVA content but markedly reduced its conversion to cis-9,trans-11 CLA [16]. Abomasal infusion of sterculia oil in dairy cows inhibited SCD activity and decreased cis-9,trans-11 CLA content by 70% [17].

In this study, phoenix tree seed oil supplementation significantly increased trans-11 C18:1 and trans-9,12 C18:2 contents while decreasing C18:3(n-6) content in Longissimus dorsi muscle, without significantly affecting other fatty acids. This likely reflects increased ruminal hydrogenation substrates for CLA and TVA synthesis, coupled with effective SCD inhibition by sterculic acid in phoenix tree seed oil, which reduced TVA-to-CLA conversion and prevented cis-9,trans-11 CLA accumulation. The lack of significant effects on trans-11 C18:1, cis-9,trans-11 CLA, and cis-12,trans-10 CLA in subcutaneous fat may be attributed to differential fatty acid deposition among tissues or absence of effects on fatty acid metabolism-related enzyme gene expression in subcutaneous fat. Additionally, phoenix tree seed oil significantly increased C20:1 content in subcutaneous fat.

As an SCD promoter, rosiglitazone enhances SCD gene expression to convert SFA to MUFA and TVA to cis-9,trans-11 CLA. Results showed that rosiglitazone increased trans-11 C18:1, trans-9,12 C18:2, cis-9,trans-11 CLA, and PUFA contents and PUFA/SFA ratio while decreasing SFA content in Longissimus dorsi muscle. Rosiglitazone also decreased C18:3(n-6) content in muscle and increased C10:0, cis-9 C18:1, and C20:3(n-3) contents in subcutaneous fat, with cis-12,trans-10 CLA being undetectable in subcutaneous fat. These results suggest rosiglitazone may enhance n-3 PUFA while reducing n-6 PUFA, though this hypothesis requires further investigation due to limited relevant research.

Conclusions

1. Dietary phoenix tree seed oil supplementation increased trans-11 C18:1 and trans-9,12 C18:2 contents, decreased C18:3(n-6) content in sheep Longissimus dorsi muscle, and increased C20:1 content in subcutaneous fat.
2. Dietary rosiglitazone supplementation increased trans-11 C18:1, trans-9,12 C18:2, and cis-9,trans-11 CLA contents, decreased C18:3(n-6) content in sheep Longissimus dorsi muscle, and increased C10:0, cis-9 C18:1, and C20:3(n-3) contents in subcutaneous fat.

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Note: Figure translations are in progress. See original paper for figures.